

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) A method for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the method comprising the steps of:

identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

assigning a score to each candidate time;

evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times.

8. (Amended) A system for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of

time, each commercial break including one or more commercials, the system comprising:

means for identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

means for assigning a score to each candidate time;

means for evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

means for constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times.

9. (Amended) A computer readable storage medium or media encoded with one or more computer programs including instructions for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the one or more computer programs comprising:

instructions for identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

instructions for assigning a score to each candidate time;

instructions for evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

instructions for constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times.

10. (Amended) A method for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the method comprising the steps of:

identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual

content, each candidate time representing a possible starting and/or ending time of a commercial;

assigning a score to each candidate time; and

constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times.

11. (Amended) A method for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, wherein candidate times, each candidate time representing a possible starting and/or ending time of a commercial within the duration of time spanned by the set of audiovisual content, have been identified based on an evaluation of one or more cues identified in the audiovisual content and a score assigned to each candidate time, the method comprising the steps of:

evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after

the step of evaluating and 2) a relationship between, or relationships among, the candidate times.

Please enter the following new claims:

12. (New) A method as in Claim 1, wherein the step of assigning further comprises the step of assigning the same score to each candidate time.

13. (New) A method as in Claim 1, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the type of cue or cues evaluated to identify the candidate time.

14. (New) A method as in Claim 1, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the degree of presence in the audiovisual content of the cue or cues evaluated to identify the candidate time.

15. (New) A method as in Claim 1, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the degree of confidence of identification of the cue or cues evaluated to identify the candidate time.

16. (New) A method as in Claim 1, wherein the step of evaluating further comprises the step of determining the presence or absence of a secondary cue within a time window that includes the candidate time or to which the candidate time is sufficiently proximate.

17. (New) A method as in Claim 16, wherein the duration and/or location of the time window depends on the type of the secondary cue.

18. (New) A method as in Claim 16, wherein the score is adjusted in accordance with the type of the secondary cue.

19. (New) A method as in Claim 16, wherein the score is adjusted in accordance with the degree of presence of the secondary cue.

20. (New) A method as in Claim 16, wherein the score is adjusted in accordance with the degree of confidence of identification of the secondary cue.

21. (New) A method as in Claim 1, wherein the step of evaluating further comprises the step of comparing the candidate time and/or a relationship between, or relationships among, the candidate time and one or more other candidate times to one or more probability models that specify one or more expected characteristics of commercial start and/or end times, and/or an

expected relationship between, or relationships among, commercial start and/or end times.

22. (New) A method as in Claim 21, wherein one of the probability models specifies the expected temporal separation of commercial start and end times.

23. (New) A method as in Claim 21, wherein one of the probability models specifies the expected location of one or more commercial start and/or end times within the duration of time spanned by the set of audiovisual content.

24. (New) A method as in Claim 21, wherein one of the probability models is derived from statistics concerning any type of audiovisual content.

25. (New) A method as in Claim 21, wherein one of the probability models is derived from statistics concerning only audiovisual content that is of the same type as the set of audiovisual content in which the one or more commercials breaks are being detected.

26. (New) A method as in Claim 1, wherein the score adjustment varies in accordance with the magnitude of the score before adjustment.

27. (New) A method as in Claim 1, further comprising the step of eliminating candidate times having an adjusted score below a specified threshold.

28. (New) A method as in Claim 1, wherein the step of constructing further comprises the step of comparing a relationship between, or relationships among, the candidate times to one or more probability models that specify an expected relationship between, or relationships among, commercial start and/or end times.

29. (New) A method as in Claim 28, wherein one of the probability models specifies the expected duration of a commercial break.

30. (New) A method as in Claim 28, wherein one of the probability models specifies the expected temporal separation of commercial breaks.

31. (New) A method as in Claim 28, wherein one of the probability models is derived from statistics concerning any type of audiovisual content.



32. (New) A method as in Claim 28, wherein one of the probability models is derived from statistics concerning only audiovisual content that is of the same type as the set of audiovisual content in which the one or more commercials breaks are being detected.

33. (New) A method as in Claim 28, wherein the step of constructing further comprises the steps of:

- selecting the candidate time with the highest adjusted score to be a commercial start and/or end time in a current commercial break;

- successively evaluating each candidate time not yet part of a commercial break, in order of decreasing adjusted score, for possible inclusion in the current commercial break as a commercial start and/or end time, wherein the evaluation of each candidate time for possible inclusion in the current commercial break comprises the steps of:

  - determining whether each probability of the temporal separation between the candidate time being evaluated and a candidate time already included in the current commercial break is above a specified threshold value;

  - determining whether the probability of the duration of the current commercial break, if the candidate time being evaluated is added to the current commercial break, is above a specified threshold value;
  - and

determining whether each probability of the temporal separation between the candidate time being evaluated and an already existing commercial break, if any, is above a specified threshold value, wherein if each of the three probabilities is above the corresponding specified threshold value, the candidate time being evaluated is added to the current commercial break;

determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the steps of:

selecting the candidate time having the highest adjusted score above the specified threshold value that has not yet been included in a commercial break and has not yet been excluded from inclusion in a commercial break;

determining whether each probability of the temporal separation between the selected candidate time and an already existing commercial break is above a specified threshold value;

if each probability is above the specified threshold value, performing the steps of:

identifying the selected candidate time as a commercial start and/or end time in a current commercial break; and

repeating the step of successively evaluating; and

if each probability is not above the specified threshold value, performing the steps of:

excluding the selected candidate time from inclusion in a commercial break; and

repeating the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break; and

if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the step of identifying the start and end time of each commercial break and the start time of each commercial in each commercial break.

34. (New) A method as in Claim 33, wherein the step of constructing further comprises the steps of:

determining whether there are any candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break, performing the steps of:

for each such candidate time that has not yet been included in a commercial break, performing the steps of:

identifying the most temporally proximate commercial break to the candidate time;

determining whether the probability of the duration of the most temporally proximate commercial break, if the candidate time is added to that commercial break, is above a specified threshold value; and

determining whether each probability of the temporal separation between the candidate time and a commercial break other than the most temporally proximate commercial break, if any, is above a specified threshold value, wherein if each of the two probabilities are above the corresponding specified threshold value, the candidate time is added to the most temporally proximate commercial break;

if the candidate time is added to the most temporally proximate commercial break, performing the steps of:

repeating the step of successively evaluating, for each candidate time having an adjusted score above a specified threshold value that has not yet been included in a commercial break, wherein the resulting commercial break is a modified commercial break;

for each candidate time of the modified commercial break, performing the steps of:

computing the average of the probabilities of each temporal separation between the candidate time and a temporally adjacent candidate time;

if the average is below a specified threshold value, performing the steps of:

if the adjusted score of the candidate time is lower than the average adjusted score of the adjacent candidate times, eliminating the candidate time; and

if the adjusted score of the candidate time is not lower than

the average adjusted score of the adjacent candidate times, eliminating any adjacent candidate time that is less than a specified duration of time from the candidate time;

computing the average score of all of the candidate times of the modified commercial break;

comparing the average score of all of the candidate times of the modified commercial break to the average score of all of the candidate times of the commercial break before modification;

if the average score of all of the candidate times of the modified commercial break is greater than the average score of all of the candidate times of the original commercial break before modification, replacing the original commercial break with the modified commercial break; and

if the average score of all of the candidate times of the modified commercial break is not greater than the average score of all of the candidate times of the original commercial break before modification, retaining the original commercial break; and

if the candidate time is not added to the most temporally proximate commercial break, performing the step of excluding the candidate time from inclusion in a commercial break; and determining whether a modified commercial break replaced an original commercial break;

if a modified commercial break replaced an original commercial break, repeating the step of determining whether there are any candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and the conditional step appropriate for the result of that determination; and

if no modified commercial break replaced an original commercial break, performing the step of maintaining the identification of the start and end time of each commercial break and the start time of each commercial in each commercial break as existent prior to the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break; and

if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break, performing the step of maintaining the identification of the start and end time of each commercial break and the start time of each commercial

in each commercial break as existent prior to the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break.

35. (New) A method as in Claim 1, further comprising the step of editing the audiovisual content based on the detected commercial breaks.

36. (New) A method as in Claim 35, wherein the step of editing the audiovisual content based on the detected commercial breaks further comprises the step of deleting the audiovisual content representing a commercial.

37. (New) A method as in Claim 35, wherein the step of editing the audiovisual content based on the detected commercial breaks further comprises the step of modifying the audiovisual content representing a commercial.

38. (New) A method for viewing audiovisual content in which commercial breaks have been detected as in Claim 1, comprising the step of skipping a commercial during viewing of the audiovisual content.



39. (New) A method for reviewing audiovisual content in which commercial breaks have been detected as in Claim 1, comprising the step of searching for a commercial within the audiovisual content.

40. (New) A method as in Claim 1, wherein the audiovisual content is represented by a television signal.

41. (New) A method as in Claim 1, wherein the audiovisual content is represented by computer-readable data.

42. (New) A method as in Claim 41, wherein audiovisual content is represented by computer-readable data acquired via a computer network.

43. (New) A method as in Claim 42, wherein audiovisual content is represented by computer-readable data acquired via the Internet.

44. (New) A method as in Claim 1, wherein the method detects the one or more commercial breaks in real time as the audiovisual content is acquired for display by a display device.

45. (New) A method for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the method comprising the steps of:

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selecting a plurality of times within the duration of time spanned by the set of audiovisual content as a current set of commercial starting and/or ending times;

selecting a revised set of commercial starting and/or ending times including the current set of commercial starting and/or ending times and one or more additional times within the duration of time spanned by the set of audiovisual content; and

comparing the revised set of commercial starting and/or ending times to the current set of commercial starting and/or ending times to determine whether the revised set of commercial starting and/or ending times constitute a better set of commercial starting and/or ending times than the current set of commercial starting and/or ending times, wherein:

if not, the method further comprises the step of identifying the current set of commercial starting and/or ending times as a final set of commercial starting and/or ending times; and

if so, the method further comprises the steps of:

identifying the revised set of commercial starting and/or ending times as the current set of commercial starting and/or ending times;

performing the step of selecting a revised set of commercial starting and/or ending times; and

performing the step of comparing the revised set of commercial starting and/or ending times to the current set of commercial starting and/or ending times.

46. (New) A method as in Claim 45, wherein the step of selecting a current set of commercial starting and/or ending times further comprises the steps of:

identifying candidate times within the duration of time spanned by the set of audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial; and

selecting candidate times as one of the current set of commercial starting and ending times based on an evaluation of each candidate time to determine a likelihood that the candidate time is a commercial starting time or ending time.

47. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

identifying a candidate time within the duration of time spanned by the set of audiovisual content, the candidate time representing a possible starting and/or ending time of a commercial; and

evaluating the candidate time to determine a likelihood that the candidate time is a commercial starting time and/or ending time, wherein the evaluation is based at least in

part on one or more characteristics of audiovisual content occurring after the candidate time.

48. (New) A method as in Claim 47, wherein the evaluation is further based, in part, on one or more characteristics of audiovisual content occurring before the candidate time.

49. (New) A method as in Claim 47, wherein the evaluation is based on one or more characteristics of audiovisual content occurring throughout the entire duration of time.

50. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

identifying a candidate time within the duration of time spanned by the set of audiovisual content, the candidate time representing a possible starting and/or ending time of a commercial; and

evaluating the candidate time to determine a likelihood that the candidate time is a commercial starting time and/or ending time, wherein the evaluation is based at least in part on a relationship of the candidate time to one or more other candidate times.

51. (New) A method as in Claim 50, wherein the evaluation is based on a relationship of the candidate time to all other candidate times.

52. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

evaluating the audiovisual content to identify the presence of a cue regarding the absence of a usually present network icon; and

identifying a candidate time within the duration of time spanned by the set of audiovisual content based on an evaluation of the identified cue, the candidate time representing a possible starting and/or ending time of a commercial.

53. (New) A method as in Claim 52, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a sequence of black frames in the visual content, wherein a candidate time is identified based on an evaluation of one or more network icon and/or black frame cues.

54. (New) A method as in Claim 52, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding an audio pause in the audio content, wherein a candidate time is identified based on an evaluation of one or more network icon and/or audio pause cues.

55. (New) A method as in Claim 52, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a scene cut or fade in the visual content, wherein a candidate time is identified based on an evaluation of one or more network icon and/or scene cut/fade cues.

56. (New) A method as in Claim 52, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding the occurrence of specified closed-captioning formatting signals and/or the absence of closed-captioning, wherein a candidate time is identified based on an evaluation of one or more network icon and/or closed-captioning cues.

57. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

evaluating the audiovisual content to identify the presence of a cue regarding the presence of music in the audio content; and

identifying a candidate time within the duration of time spanned by the set of audiovisual content based on an evaluation of the identified cue, the candidate time representing a possible starting and/or ending time of a commercial.

58. (New) A method as in Claim 57, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a sequence of black frames in the visual content, wherein a candidate time is identified based on an evaluation of one or more music and/or black frame cues.

59. (New) A method as in Claim 57, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding an audio pause in the audio content, wherein a candidate time is identified based on an evaluation of one or more music and/or audio pause cues.

60. (New) A method as in Claim 57, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a scene cut or fade in the visual content, wherein a candidate time is identified based on an evaluation of one or more music and/or scene cut/fade cues.

61. (New) A method as in Claim 57, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding the occurrence of specified closed-captioning formatting signals and/or the absence of closed-captioning, wherein a candidate time is identified based on an evaluation of one or more music and/or closed-captioning cues.

62. (New) A method as in Claim 57, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding the absence of a usually present network icon, wherein a candidate time is identified based on an evaluation of one or more music and/or network icon cues.

63. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

evaluating the audiovisual content to identify the presence of a cue regarding the density of scene cuts or fades in the visual content; and

identifying a candidate time within the duration of time spanned by the set of audiovisual content based on an evaluation of the identified cue, the candidate time representing a possible starting and/or ending time of a commercial.

64. (New) A method as in Claim 63, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a sequence of black frames in the visual content, wherein a candidate time is identified based on an evaluation of one or more scene cut/fade density and/or black frame cues.



65. (New) A method as in Claim 63, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding an audio pause in the audio content, wherein a candidate time is identified based on an evaluation of one or more scene cut/fade density and/or audio pause cues.

66. (New) A method as in Claim 63, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding a scene cut or fade in the visual content, wherein a candidate time is identified based on an evaluation of one or more scene cut/fade density and/or scene cut/fade cues.

67. (New) A method as in Claim 63, further comprising the step of evaluating the audiovisual content to identify the presence of a cue regarding the occurrence of specified closed-captioning formatting signals and/or the absence of closed-captioning, wherein a candidate time is identified based on an evaluation of one or more scene cut/fade density and/or closed-captioning cues.

68. (New) A method for detecting a commercial in a set of audiovisual content spanning a duration of time, the method comprising the steps of:

evaluating the audiovisual content to identify the presence of a cue regarding speaker identity; and